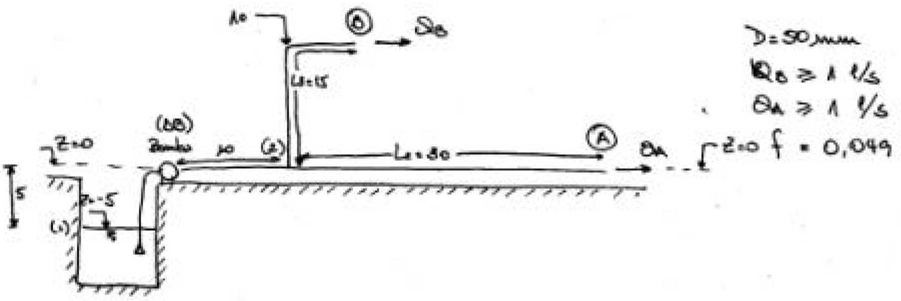

$$B_1 = z_1 + \cancel{\frac{p_1}{\gamma}} + \cancel{\frac{v_1^2}{2g}} = -5$$

$$B_2 = B_1 - \Lambda_{1-2} + \Delta B = -5 - f\frac{(L_1+5)}{D}\frac{v_{1-2}^2}{2g} + \Delta B \qquad \text{con} \quad v_{1-2} = \frac{(Q_A+Q_B)}{\frac{\pi D^2}{4}}$$

$$\Rightarrow B_2 = -5 + \Delta B - \frac{f(L_1+5)\cdot 16(Q_A+Q_B)^2}{\pi^2 D^5\, 2g}$$

$$B_A = B_2 - \Lambda_{2-A} = B_2 - \frac{f L_2}{D}\frac{v_{2-A}^2}{2g} \qquad \text{con} \quad v_{2-A} = \frac{Q_A}{\frac{\pi D^2}{4}}$$

$$B_A = -5 + \Delta B - \frac{f(L_1+5)\cdot 16(Q_A+Q_B)^2}{\pi^2 D^5\, 2g} - \frac{f L_2 \cdot 16\, Q_A^2}{\pi^2 D^5\, 2g} = -5 + \Delta B - \frac{16 f}{\pi^2 D^5\, 2g}\left[(L_1+5)(Q_A+Q_B)^2 + L_2 Q_A^2\right]$$

Por otro lado:

$$B_A = \cancel{z_A} + \cancel{\frac{p_A}{\gamma}} + \frac{v_A^2}{2g} = \frac{16\, Q_A^2}{\pi^2 D^4\, 2g}$$

$$\Rightarrow -5 + \Delta B - \frac{16 f}{\pi^2 D^5\, 2g}\left[(L_1+5)(Q_A+Q_B)^2 + L_2 Q_A^2\right] = \frac{16\, Q_A^2}{\pi^2 D^4\, 2g}$$

$$\Rightarrow \boxed{-5 + \Delta B = \frac{16 f}{\pi^2 D^5\, 2g}\left[Q_A^2 \frac{D}{f} + (L_1+5)(Q_A+Q_B)^2 + L_2 Q_A^2\right]} \quad (1)$$

Analogamente:

$$B_B = B_2 - \Lambda_{2-B} = B_2 - \frac{f L_3}{D}\frac{v_{2-B}^2}{2g} \qquad \text{con} \quad v_{2-B} = \frac{Q_B}{\frac{\pi D^2}{4}}$$

$$B_B = -5 + \Delta B - \frac{f(L_1+5)\, 16(Q_A+Q_B)^2}{\pi^2 D^5\, 2g} - \frac{f L_3\, 16\, Q_B^2}{\pi^2 D^5\, 2g} = -5 + \Delta B - \frac{16 f}{\pi^2 D^5\, 2g}\left[(L_1+5)(Q_A+Q_B)^2 + L_3 Q_B^2\right]$$

Por otro lado:

$$B_B = Z_B + \cancel{\frac{P_B}{\gamma}} + \frac{V_B^2}{2g} = 10 + \frac{16\,Q_B^2}{\pi^2 D^4 2g}$$

$$\Rightarrow -5 + \Delta B - \frac{16 f}{\pi^2 D^5 2g}\left[(L_1+5)(Q_A+Q_B)^2 + L_3 Q_B^2\right] = 10 + \frac{16\,Q_B^2}{\pi^2 D^4 2g}$$

$$\boxed{-15 + \Delta B = \frac{16 f}{\pi^2 D^5 2g}\left[Q_B^2 \frac{D}{f} + (L_1+5)(Q_A+Q_B)^2 + L_3 Q_B^2\right]} \quad (2)$$

Restando (1) con (2), tenemos:

$$10 = \frac{16 f}{\pi^2 D^5 2g}\left[Q_A^2\left(\frac{D}{f}+L_2\right) - Q_B^2\left(\frac{D}{f}+L_3\right)\right] \quad (3)$$

Si suponemos que Q_B es menor que $Q_A \Rightarrow Q_B = 1$ l/s

Reemplazamos $Q_B = 1$ l/s en (3) se obtiene $Q_A = 5$ l/s.

$$\Rightarrow Q_A = 5 \text{ l/s}$$
$$Q_B = 1 \text{ l/s}$$

Luego reemplazando Q_A y Q_B en (1) o en (2), se obtiene:

$$\Rightarrow \boxed{\Delta B \simeq 22 \text{ m}}$$

∴ la bomba debe provocar una variación de Bernoulli de 22 m para que el caudal mínimo en A y B sea de 1 l/s.